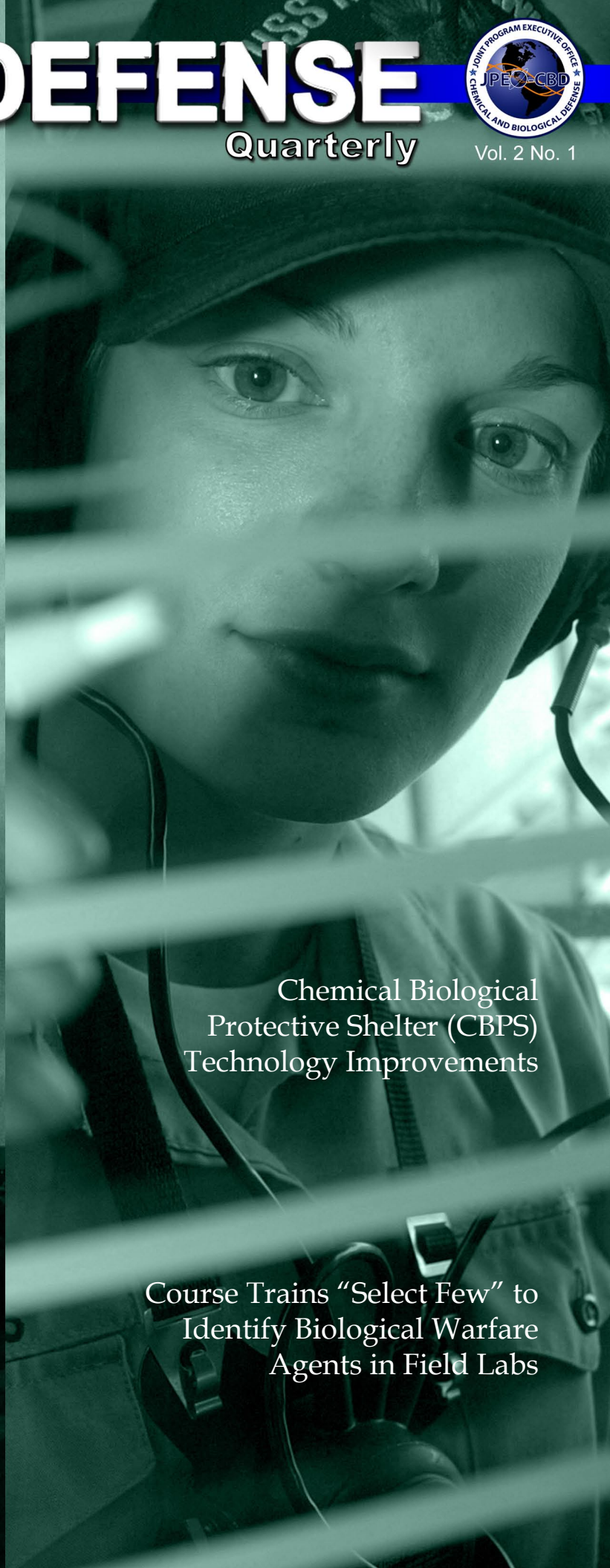
CHEM-BIO DEFENSE Quarterly

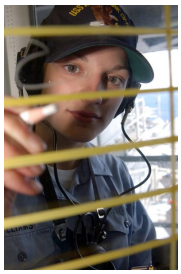
Vol. 2 No. 1

The Joint Service Mask Leakage Tester (JSMLT) Helping to Ensure Protective Mask Readiness



Chemical Biological Protective Shelter (CBPS) Technology Improvements

Course Trains "Select Few" to Identify Biological Warfare Agents in Field Labs



Cover photos by:
(Left) The superstructure of the USS Harry S. Truman's silhouette during a sunset in the Arabian Sea. U.S. Navy photo by Photographer's Mate Airman, Kristopher Wilson.
(Right) Quartermaster Seaman Lauren Williams, from Rhode Island, N.Y., maintains a status board on the USS Kitty Hawk (CV-63) bridge. U.S. Navy photo by Photographer's Mate 3rd Class, Jo Wilbourn.

Soldiers from 2nd Battalion, 7th Cavalry Regiment stage outside Fallujah, Iraq awaiting further orders during the beginning of Operation Al Fajr (New Dawn), Fallujah, Iraq, Nov. 8, 2004.

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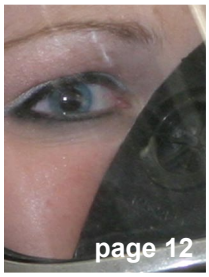
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Col. Don Burnett
USA

Col. Camille Nichols
USA

Mr. Doug Bryce
USMC

Capt. Tom O'Keefe
USN

Col. Stephen Berté
USA

Col. Albert Burnett
USAF

Mr. Stan Enatsky
USN

From the Joint Program Executive Officer

Brigadier General Stephen V. Reeves
Joint Program Executive Officer
for Chemical and Biological Defense

In the 1500's, after developing a toxic powder weapon, Leonardo daVinci described a simple protective mask for sailors: "... have your nose and mouth covered with a fine cloth dipped in water. ..." Nearly 400 years later, at Ypres, Belgium, following the first German chlorine gas attack, British soldiers were advised to, "wet your handkerchief and tie them over your face."

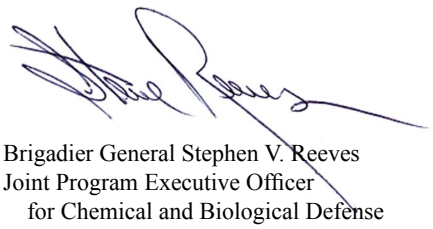
After that attack on April 22, 1915, the world's armed forces fully recognized the chemical and biological threat and began developing effective defenses.

This Chem-Bio Defense Quarterly highlights both the progress and the future of individual and collective protection throughout the U.S. armed forces and the project managers delivering these new capabilities to warfighters. These new capabilities include enhancing the U.S. Navy's capability to manage damage control evolutions since installing Collective Protective Shelters. These protected shipboard environments provide a safe-haven from areas contaminated by toxic gas, toxic fumes, soot and ash; as was the case on the USS Cole (DDG 67).

One Mask, Many Missions, Many Environments, covers the next generation individual protective mask, the Joint Service General Purpose Mask (JSGPM). The JSGPM is the result of the cooperation, expertise and experience of warfighters, scientists, engineers, technicians and commercial industry and all the military services to develop and deliver a common protective mask.

Additionally, we discuss how we balance future needs while meeting deployed forces immediate operational needs. As non-traditional threats become the norm, we are delivering to forces in the field, toxic industrial chemical and toxic industrial material protection and detection capabilities as well as advanced analytical identification capabilities, along with all necessary training.

Finally, on page 30 is a readership survey that I ask you to take a moment to fill out and return to our editor – by snail-mail or email. This information will tell us if we are meeting your expectations in this and past issues. More importantly, it will ensure we are on target in future issues. We look forward to your candid responses.



Brigadier General Stephen V. Reeves
Joint Program Executive Officer
for Chemical and Biological Defense

Joint Program Executive Office

Brig. Gen. Stephen V. Reeves
Joint Program Executive Officer

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Director, Technology Integration

Brenda Besore
Director, Information Technology

Larry Wakefield
Director, Systems Support

Magazine Staff

Julius L. Evans
Editor
Julius.Evans@jpeocbd.osd.mil

Steven Lusher
Senior Graphic Designer
Steve.Lusher@jpeocbd.osd.mil

Tonya Maust
Graphic Designer
Tonya.Maust@jpeocbd.osd.mil

Michelle McCorkle
Distribution
Michelle.McCorkle@jpeocbd.osd.mil

Patricia Estep
Webmaster
webmaster@jpeocbd.osd.mil

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To contact the editorial office:

Call (703) 681-9600/5197 or
DSN 588-9600/5197

Fax (703) 681-3454
DSN 761-3454

Email: editor@jpeocbd.osd.mil.

Articles should be submitted to:
Chem-Bio Defense Quarterly
5203 Leesburg Pike
Skyline 2, Suite 1609
Falls Church, VA 22041
www.jpeocbd.osd.mil

THE NEW PM ON THE BLOCK

By Maj. Eric Rannow, PM-FPS

The Army's Product Manager for Force Protection Systems (PM-FPS) officially became the newest chartered organization within Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) on June 11, 2004.

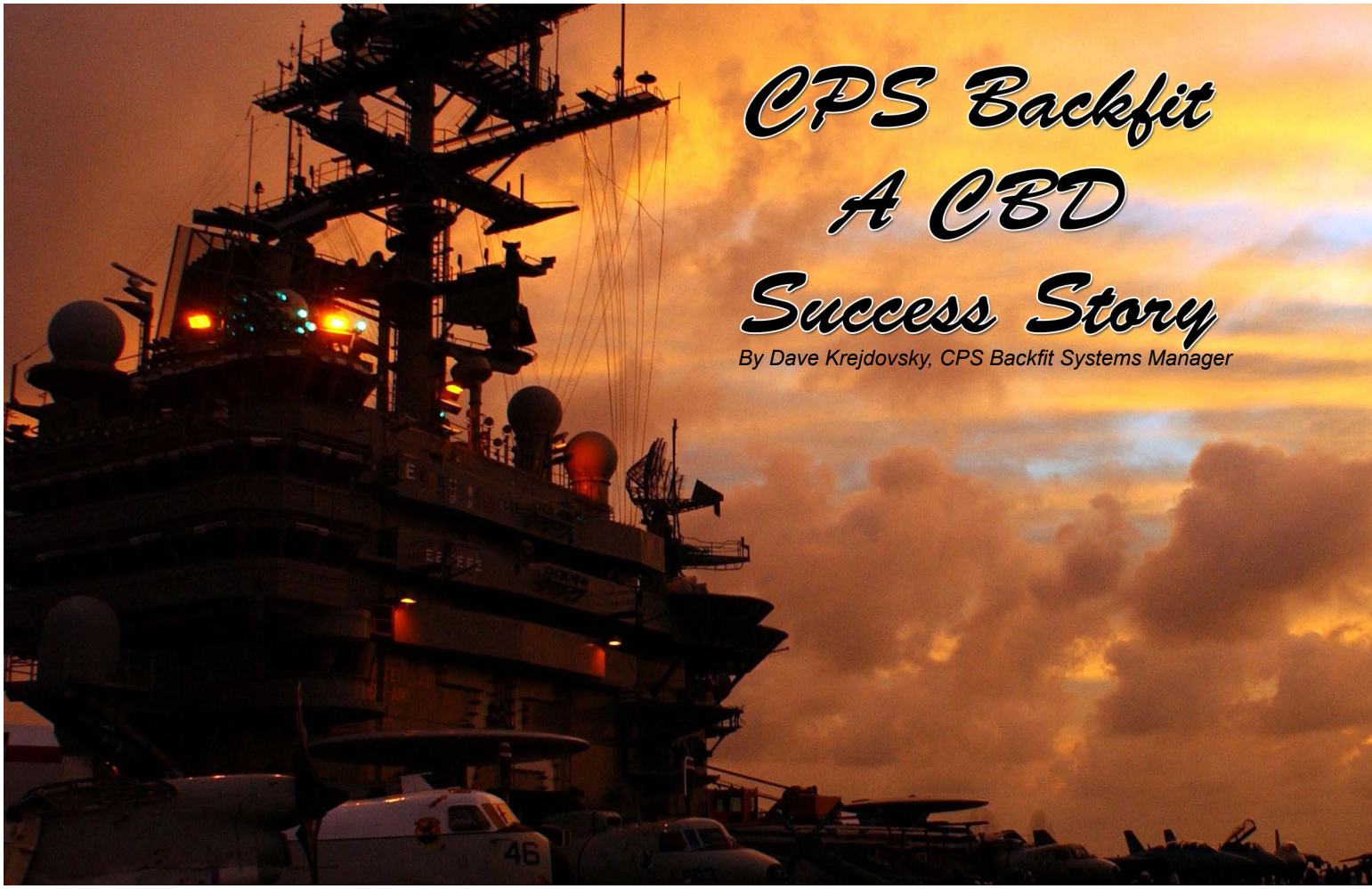
Despite being a fresh face in the chemical and biological community, PM-FPS has been in the force protection and physical security business since being established in 1977.

For more than 28 years, PM-FPS has been aligned under different headquarter organizations and transitioned through a name redesignation. Through these changes, PM-FPS's role as the Army's centralized manager for physical security and selected force protection equipment has been constant. PM-FPS is comprised of a core staff of two military and eleven government employees supported by both government matrix and contractor support personnel. PM-FPS employs engineers, physical security specialists and scientists to meet the force protection needs of the Army.

The mission of PM-FPS is to provide affordable, modular, scaleable, and supportable tactical force protection capabilities to forward deployed forces while simultaneously providing, state-of-the-art physical security equipment to Army installations worldwide. Whether garrisoned at home station or deployed into harms way, the goal of PM-FPS is to provide Soldiers with the best force protection available. The focus of PM-FPS is to deliver emerging technologies that reduce manpower requirements while further enhancing Soldier protection. The complimentary benefits of this focus are twofold as emerging technologies reduce Soldier exposure to hazards and enable commanders to dedicate more manpower toward core warfighting missions.

At first glance, PM-FPS's connection with the chemical and biological defense community may seem tenuous but the linkage becomes clear upon closer review. The Joint Project Manager (JPM) Guardian provides installation Chemical, Biological, Radiological, and Nuclear (CBRN) protection, detection, identification, and warning systems for JPEO-CBD. PM-FPS also provides expertise in robotics, detection communication architecture, and installation site survey experience. In addition, PM-FPS has knowledge in evolutionary sensor technology to include, sensor miniaturization, tactical sensor development, and integrating disparate sensors. PM-FPS is proud to be the newest member of the JPEO-CBD team and looks forward to being an active and contributing member of this diverse and dynamic organization.

U.S. Army photo by Staff Sgt. Michael Nasworthy



CPS Backfit A CBD Success Story

By Dave Krejdovsky, CPS Backfit Systems Manager

Seventeen Sailors lost their lives on October 12, 2000 when terrorists attacked the guided missile destroyer USS Cole (DDG 67). The ship was significantly damaged and the crew struggled to keep her afloat while fighting fires and toxic fumes. The Sailors soon realized that zones protected with CPS remained free of soot, ash and toxic fumes. One of the zones adjacent to the damaged area was used as a staging area to fight the fire. Additional CPS zones were used as rest and relief area for the Sailors. The one advantage these sailors had was the USS Cole like other DDG class ships had several zones outfitted with Collective Protective System (CPS).

Another benefit provided by CPS during the aftermath of the terrorist attack on the USS Cole was its usefulness in a toxic gas environment. After the attack, the refrigeration area on the ship was contaminated with dangerous levels of hydrogen sulfide. CPS was vital to the safe resolution of this problem by venting out the toxic gas through the damaged hull and preventing it from being drawn back into the ship. This is just one of the reasons why CPS is so vital to surface combatants.

Shipboard CPS operates on a full-time basis in conjunction with a ship's existing heating, ventilation, and air conditioning system creating protected areas within sealed boundaries of ship spaces. The protected areas are maintained at a positive pressure with continually filtered air creating a contaminant-free environment or CPS Zone. The higher pressure within the CPS Zone prevents unfiltered outside air at a lower pressure from entering the space. Therefore, Individual Protective Equipment (IPE) is not required during operations within the CPS Zones regardless of the outside environment. Airlocks and decontamination stations provide controlled access to the pressurized CPS Zones.

The first CPS was installed on the USS Belleau Wood (LHA-3) in the early 1980's for developmental and operational testing. As a result of this successful installation, the Navy approved requirements for the installation of CPs on several classes of new construction ships. These new construction ships include Aegis-class destroyers (DDG) as well as several amphibious (LSD, LHA, and LHD) and support ship (AOE) classes. CPS coverage varies by ship class, and ranges from the entire ship interior (DDG-51 class) to zone specific coverage systems (LSD, LHA, LHD, and AOE classes).

As the number of new construction CPS installations grew through the late 1980s and into the 1990s, it became apparent that ships built before CPS requirement were promulgated would remain vulnerable during operations in a chem-bio environment without some type of CPS that could be easily retrofitted or "backfitted" on existing fleet ships.

In 1997, the Quadrennial Defense Review recognized that defense against weapons of mass destruction was to be a high priority. In response, the Navy developed a CPS Backfit Plan that identified high priority amphibious assault (LHA and LHD classes) and dock landing (LSD class) ships and specific ship areas to receive CPS. Those spaces to be protected by CPS were identified, in priority order, as: 1) LHD class medical area and


U.S. Navy photo by PHAN Kristopher Wilson

the command/control area, 2) LHA class medical area, command/control area, and berthing area, and 3) LSD command/control and crew sustainability areas. Since program initiation in FY00, the CPS Backfit team has successfully executed eight installations to include the USS Wasp (LHD-1), USS Essex (LHD-2), USS Kearsarge (LHD-3), USS Boxer (LHD-4), USS Bataan (LHD-5), USS Tarawa (LHA-1), USS Belleau Wood (LHA-3) and USS Peleliu (LHA-5).

The CPS Backfit Process

Under the direction of the Joint Project Manager for Collective Protection (JPM-CP), the Shipboard CPS Backfit team at the Naval Surface Warfare Center Dahlgren Division (NSWCDD) provides hands-on, day-to-day technical management and waterfront support for shipboard CPS. In addition to day-to-day management of the Shipboard CPS Backfit program, responsibilities of the team range from cradle-to-grave for the system. Team engineers designed the entire system, provide direct technical support to the shipyard design and construction engineers, and closely direct all aspects of the complex system installation. In addition, team members provide system indoctrination and training through extensive on-site interaction on the "deckplates" with the crew of each ship. The team also provides regular follow-on technical support on the waterfront to the ships after the system is installed.

CPS Backfit installed filters and pre filters

The CPS Backfit Program also provides the U.S. Navy with the shipboard capability to decontaminate wounded personnel and transfer them into a collectively protected space to receive medical attention. This decontamination system was developed and subsequently improved by the NSWCDD CPS Backfit Team in cooperation with the Bureau of Medicine.

CPS Backfit installations are accomplished during planned maintenance "availabilities" for the ships involved. A maintenance availability is a scheduled period during which a variety of maintenance actions are accomplished on a specific ship. During the availability, CPS Backfit installation is accomplished in parallel with numerous other maintenance actions.

The production drawings for the first ship in a class to be backfit with CPS are developed by a "planning yard" such as Norfolk Naval Shipyard (NNSY). Approximately 12-18 months before the start of a maintenance availability, NNSY personnel perform a "ship check." During the ship check the production drawings for the specific ship class are compared to the actual ship configuration to ensure accuracy. Drawing changes are made as appropriate. This is necessary because each ship in a class may have unique features. Among other responsibilities, the planning yard is responsible for ship configuration control and documenting any design changes to be made. CPS Backfit team engineers actively support this effort to resolve technical problems and/or issues.

A CPS Supply Fan is rigged in preparation for installation. This integral component of CPS was developed at NSWC-DD to reduce noise and increase overall performance.

After the ship check, a set of Ship Installation Drawings (SIDs) are developed. These drawings document the specific changes that must be made to accomplish CPS Backfit installation on that particular ship. NSWCDD CPS Backfit team engineers also play an active role in this phase of the planning process by participating in drawing reviews, ensuring that lessons learned from previous installations are considered, and by resolving technical issues that are discovered as the drawings are completed. Once completed, these SIDs will be provided to the potential installation contractor(s) to develop cost proposals for the installation.

The NSWCDD CPS Backfit team engineers also play an active role in the installation cost development process. The CPS Backfit engineers use lessons learned from previous installations which are incorporated into subsequent installations to help ensure that the installation costs remain fair and reasonable.

Installations are accomplished by contractors. During the installation process, the CPS Backfit on-site engineer helps to maintain installation cost control by interfacing directly with the contractor on a day-to-day basis to document and expedite resolution of any technical issues or contract task changes that may be required.

As described herein, the NSWCDD CPS Backfit teams direct "hands-on" approach to technical management of all aspects of the program has directly contributed to the continuing, long-term success of the CPS Backfit program.

The NSWC-DD CPS Backfit team's management and execution were recently highlighted during the USS Peleliu (LHA-5) 2004 Planned Maintenance Availability (PMA) "Hot Wash and Lessons Learned Conference" as a "Best Practice" installation because of the team's active role in pre-installation preparation through shipboard briefs, pre-planning, and prefabrication. Also highlighted was NSWCDD's continuous and active on-site engineering role interfacing with the installation contractor and ship's force ensuring rapid and efficient problem solving and space turnover. Remaining CPS Backfit installations include USS Bonhomme Richard (LHD-6), USS Iwo Jima (LHD-7), LHD-8, and USS Nassau (LHA-4).

Shipboard CPS operates on a full time basis in conjunction with a ship's existing heating, ventilation, and air conditioning system...

Collectively Protected Field Hospitals ...A Continuing Evolution

By Lt. Jennifer Dougherty, Kim Poehling, and Neil Holloran

A future battlefield scenario could be one where insurgents release a CB agent during a mortar attack. Soldiers don their CB protective gear but some are wounded and need immediate medical assistance. However, the area is contaminated. In a scenario like this, Collective Protection (CP) means the difference between life and death. Wounded are quickly moved to a collectively protected medical facility where medics save lives in a clean, protected, environment.

Collectively Protected Field Hospitals have as diverse a history and mission as the methods used within them to treat the warfighter. Logistically, deploying Field Hospitals has been a complicated task. The Army and Navy have relied on large shelter complexes with surgical suites and hundreds of beds (Chemically Protected Deployable Medical System (CP DEPMEDS)), whereas the Air Force has evolved using smaller, more transportable system (Chemically Protected Expeditionary Medical Support System (CP EMEDS)). Unfortunately, this contrast in mission and method between the services has lead to a non-standard CP system.

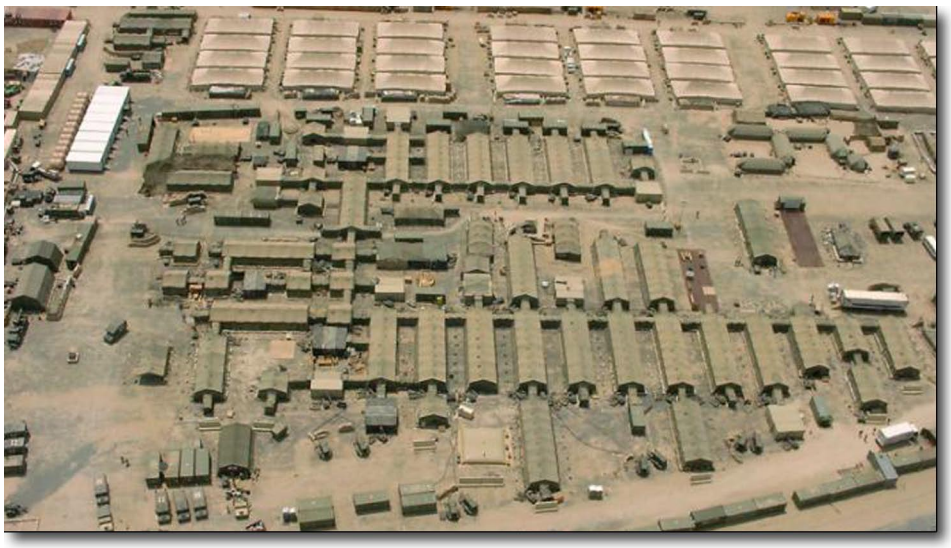
The advent of the JPEO-CBD organization has focused future CP Field Hospital effort through the JPM Collective Protection (CP) Office. Goals of JPM-CP are to decrease the logistics burden, enhance the current CP Field Hospital capabilities and introduce standardization. These efforts will be effected through transitioning technologies that will be identified in the FY05 CP Technology Readiness Evaluation (TRE).

Using the TRE and a spiral acquisition strategy will allow capability enhancements to be fielded to the CP Field Hospitals. These enhancements will effectively enable CP Field Hospital users to support battlefield wounded more efficiently in a CBR environment, thus maintaining continuity of mission operations and saving more lives.

ARMY — CP DEPMEDS

Chemically Protected Deployable Medical System (CP DEPMEDS) is a set of components that insert into soft and hard-walled shelters consisting of chemical and biological (CB) warfare resistant liners, filtration system, field deployable environmental control unit, CB-hardened latrine and an internal water system.

CP DEPMEDS provides a chemical and biological defense capability to fielded Deployable Medical Systems (DEPMEDS) allowing it the capability to sustain medical operations in a contaminated environment for 72 hours without the use of cumbersome MOPP gear. Additionally, CBD controls provide a significantly cleaner (dust and sand free) environment and a layer of thermal insulation, allowing for better temperature control.



U.S. Army Photo

CP DEPMEDS 256 Bed Capability

NAVY FLEET HOSPITAL

The mission of the Navy Fleet Hospital personnel is to provide high-level medical care to the wounded on the battlefield. In a CBR environment, Fleet Hospital personnel are required to protect themselves, their patients, equipment, and supplies from the threat of a WMD attack. Accomplishing both requires the capability of collectively protecting their fleet hospitals. Since the late 90's, the Navy Fleet Hospital Program Office has been investigating a CP capability for their existing hospital tents and medical systems. The threat identified during Operation Iraqi Freedom only served to accelerate the need for a defense against CBR attack. Currently the Navy Fleet Hospital Program Office has four Expeditionary Medical Facilities with a CP capability (modeled after CP DEPMEDS) and they are exploring the integration of CP to their Expeditionary Medical Units that allow similar high-level medical care in a more lightweight, compact, and portable package.

U.S. Navy Photo

Navy Expeditionary Medical Facility

AIR FORCE — CP EMEDS

The Air Force's CP EMEDS is a large complex of shelters that performs all the functions of a modern, fully equipped Metropolitan Hospital with the capability to be rapidly deployed to provide a full range of medical services to deployed warfighters. The added feature allows CP EMEDS to perform these wide range medical services in chemical and biological contaminated environments. The modular design of the CP EMEDS allows the users the ability to build as small (one tent) or as large (10 tents) a system as their expected patient load dictates.

The CP EMEDS provides a contamination free environment where medical treatment can be rendered to personnel without the encumbrance of individual protective equipment such as gas masks and chemically resistant clothing. The contamination free environment is accomplished with the addition of chemical/biological resistant liners to the inside of a tent, filtered air with a slight positive pressure to keep vapor out, and a controlled entry/exit airlock from the shelter. CP EMEDS provides sick, injured, or wounded deployed warfighters the advanced care of their CONUS base hospital.

The CP EMEDS has the capability to provide 24-hour sick call, 25 inpatient beds, and emergency medical care to a population at risk of 3,000 – 5,000 warfighters. The array of available services includes medical command and control, preventive medicine, trauma resuscitation and stabilization, general and orthopedic surgery, critical, urgent, and primary care, aeromedical evacuation coordination, aerospace medicine, dental, and limited ancillary services.

U.S. Army Photo

CP EMEDS +25 Setup

OIF SUPPORT

The first fielding of the CP DEPMEDS was to Operation Iraqi Freedom (OIF) with a total of seven systems. The systems performed extremely well, and were outstanding in preventing blowing sand from interfering with medical operations on the battlefield. To date, 12 CP DEPMEDS kits have been built.

Five CP EMEDS were used in support of OIF. They were "Set up in high threat areas to provide a shirtsleeve working environment in the event of attack with chemical or biological weapons." One Air Force senior leader said, "The medical support for this operation has been absolutely phenomenal—true professionals doing great things with little recognition. I love EMEDS. They pack so much capability in such a tiny footprint; I didn't have to choose between bombs and bandages." (U.S. Air Force AIM POINTS, 29 April 2003).

"Set up in high threat areas to provide a shirtsleeve working environment in the event of attack with chemical or biological weapons"

While care is still delivered in the traditional manner by battlefield corpsmen and field surgery units, the men and women of Fleet Hospital Three (FH-3) recently added to the lifesaving capabilities of Navy Medicine by constructing the Navy's first Expeditionary Medical Facility (EMF) in a war zone. The establishment of FH-3 - the Navy's first Expeditionary Medical Facility (EMF) in a war zone - adds to the lifesaving capabilities of Navy Medicine supporting Operation Iraqi Freedom.

Given today's increasing threat from battlefield WMD and the need to move with the speed of battle, it is not without merit that the aforementioned platforms require CP. Working towards a seamless system that protects lives, avoids decontamination, and accomplishes the mission in a contaminated environment is an achievable goal and the direction in which JPM CP is headed.

Chemical and Biological Protective Shelter (CBPS) Technology Improvements

By William Nykvist and Gregg Buehler

The Chemical and Biological Protective Shelter (CBPS) system is a mobile shelter system designed to provide military medical units with an environmentally controlled operations space that is protected from Chemical and Biological (CB) warfare agents. Derived from the Battalion Aid Stations of old, the system consists of a rigid-wall shelter mounted on a M1113 or M1152 High Mobility Multi-purpose Wheeled Vehicle (HMMWV) upon which a rapidly deployable air-beam supported soft walled shelter is attached. This allows the system to rapidly relocate and re-deploy to facilitate medical operations in a CB environment.

The CBPS is the support battalion Commander's primary shelter system. It provides the commander with a number of benefits to include the capability to save the lives of casualties under treatment in the event of a chemical or biological attack, which may occur at anytime. The CBPS will provide a highly mobile, clean, and environmentally controlled surgical environment. The combination of these enhancements will provide the commander with the capability to save more Soldiers' lives.

During combat operations in either conventional or chemical environments, medical evacuation support may not be available. The field commander may be required to hold seriously wounded Soldiers for a number of hours or even days in a contamination free or environmentally controlled area. The CBPS gives the commander the capability to allow casualties to be stabilized sufficiently to withstand delay in evacuation.

Operation Iraqi Freedom (OIF) was the first fielding of CBPS, with 64 systems deployed. Twenty of these systems were borrowed by USMC to enhance their capability and the rest fielded to Army units. CBPS performed extremely well in OIF, and many units had very positive feedback. In fact, the first six casualties of the war were treated in CBPS units. Soldier's comments were: "CBPS is the threshold of the future for the Army, it saves so much time, space, and equipment," and "Chances for survival are greater for any type of casualty." Fortunately CB agents were not dispersed during the war, but CBPS still provided outstanding protection against fine blowing sand and withstood tremendously strong sandstorms. To date 152 CBPSs have been fielded.

U.S. Army Photo

Deploying the Chemical and Biological Protective Shelter (CBPS)

CBPS consists of a HMMWV with a rigid-wall Lightweight Multipurpose Shelter (LMS) attached, and an air-beam-supported, 17' x 18' (300 ft2) tent that self-deploys off the rear of the shelter. Chemical and biological protection is provided by employing chem/bio filters to ensure that the air inside the LMS and tent are toxic free and over-pressurized to ensure CB agents do not seep in. Heating and cooling is provided by an environmental support system mounted over the HMMWV cab. CBPS air-beams inflate in four minutes, automatically deploying the tent, and adding doors, lights, and other components readies the tent for full medical treatment within 20 minutes. A towed generator on a utility trailer provides backup power, but the generator weight limits the capacity to 10 kilowatts. This backup power is enough to maintain chem/bio protection, but only provides a small amount of environmental control.

CBPS already incorporates some unique high tech items. CBPS was the first military production program to feature structural airbeams which provide a quantum leap in capability: the ability to self-deploy the tent in a very short time.

The airbeams used are one-piece woven structures developed under a tech base program at Natick Soldier Center, and were transitioned from tech base directly into production. They have proven to be very successful and durable, providing a quick zero-manpower setup, improving mobility, and adding the capability to set up CBPS in a contaminated area.

There are other technology improvements that will provide benefits to CBPS, specifically in the area of power. In the early development stages of CBPS, the Integrated Product Team made the decision to use the HMMWV engine as the primary power source. This approach provided the lightest weight system with technology available at that time. This was done by adding a belt-driven hydraulic motor under the hood, running the HMMWV engine at a high idle, and

U.S. Marine Photo

Installing the Chemical and Biological Protective Shelter (CBPS) Lights

powering all systems hydraulically. The HMMWV engine running at high idle easily provides the power needed for heating and cooling, overpressure with filtered air, airbeam inflation, lights, fans, and re-circulation filters in the tent. In the initial fielding in OIF, CBPS performed well and saved lives, but there were some hydraulic system failures. Fixes have been identified and are being incorporated.

The technology of lightweight diesel engines and lightweight electric generators has advanced substantially, and an all-electric approach to powering CBPS is being pursued. Permanent magnet generators will be used with a dedicated lightweight diesel engine. Additionally, backup power will be derived from another permanent magnet generator that will replace the HMMWV alternator under the hood. The first advantage is a lighter weight overall system (the 1,242 lb trailer-mounted backup generator is eliminated), providing increased capacity for medical payload. Second, lower fuel consumption is achieved by using the smaller, more efficient, variable speed engine. Third, noise is substantially reduced both inside and outside CBPS due to quieter components. And fourth, the system is more reliable and more easily controlled.

In 2001 Natick Soldier Center started a pre-planned product improvement program to develop an "Electric" variant of CBPS, where a lightweight 28 horsepower diesel engine, driving a lightweight 20-kilowatt permanent magnet generator, provides all needed power. The new engine, generator and air conditioning components fit in the same envelope dimensions of the current hydraulic overcab "pod" and the control panel features a touch-pad screen. In this approach, the HMMWV engine is then used for backup power, turning a separate permanent magnet generator under the hood. A fuel-fired unit provides heating.

Prototypes of the Electric CBPS were completed in December 2004. Early indications are that noise will be reduced by up to 10 decibels. As CBPS is often deployed in a complex of three to seven systems, reduced noise from adjacent systems will be greatly welcomed by users. The variable speed feature with the overcab diesel engine automatically provides lower engine speed at reduced power demand, resulting in less noise, less fuel used, and longer component life. There are no belts to break or replace as the permanent magnet generator is directly coupled to the engine.

An additional benefit of the electric version of CBPS is the ability to incorporate self-diagnostics into the system. Although these are not part of the first prototypes, this capability can easily be added to future units. Maintenance should be straightforward on the electric version as electrical components (inverters, converters, controllers) can be easily removed and replaced.

The CBPS production contractor will incorporate an Engineering Change into the final option quantity on the current contract, for 26 new electric CBPS systems. These CBPS systems will have all the advantages mentioned above: lighter, quieter, more efficient, and more effective. A retrofit program is planned to convert the existing hydraulic CBPS systems to the electric design. Future procurement for additional CBPS will be based on a performance specification. This performance specification will be written around the capabilities of the electric CBPS, and will be used with a new multi-year contract solicitation planned for award in FY06.

These CBPS technology advancements will provide a much-improved system for shirtsleeve medical operations in contaminated areas.

Central Commands Toxic Industrial Chemical Protection and Detection Equipment Program

By Mr. Ron Brann, Family of Incident Response Systems Team Leader

In response to a US Central Command Operational Needs Statement (ONS) the Joint Project Manager, Individual Protection (JPM-IP) provided a suite of First Responder Equipment to selected Central Command (CENTCOM) units. The ONS requested the equipping of multiple teams in support of Operation Iraq Freedom. The equipment was to provide the capability to conduct confined space operations to detect Toxic Industrial Chemicals (TICs). The fielded military equipment (Green gear) could not provide adequate personal protection in this threat scenario.

That was the "broad blue arrow" JPM-IP broke the overall program in to five subsets: First, determine the suite of equipment that meets the operational need; second, procure the equipment from commercial sources; third, provide New Equipment Training (NET); fourth, field the equipment; and fifth, provide Contractor Logistics Support (CLS) to the units in the CentCom theater of operations.

On the surface, this could presumably require the solicitation of four or five contract vehicles to complete all tasks. The process for accomplishing this would be lengthy. The JPM-IP office was in a very good position to accomplish the task immediately because the contractual vehicles to execute the tasks were already in place.

The JPM-IP office has had extensive experience in Commercial Off The Shelf (COTS) equipment used by first responders. The JPM-IP program office is collocated with the Marine Corps Systems Command's Family of Incident Response Systems (FIRS) program office. The FIRS program office has provided equipment to the U.S. Marine Corps Chemical/Biological Incident Response Force (CBIRF), the Civil Support Teams (CSTs) and various other Armed Forces programs for first responders. The FIRS office established working relationships with various other first responder agencies, to include metropolitan Hazardous Material Units to take advantage of the Unit's Subject Matter Experts that deal with TICs on a daily basis. This gave the JPM-IP office instantaneous access to a wide range of experts that could assist in developing the equipment sets for CENTCOM Units.

Photo by Steve Lusher

Civil Support Team members test their gear.

The JPM Office had the contractual vehicle in place to do the functions required to meet the needs of the ONS. It has had a Prime Vendor contract in place for more than six years. The use of Prime Vendor (PV) contracts is not unusual. However, this concept established by the JPM-IP is a broad PV that provides procurement, training, and life cycle management support. The current contract was awarded in Fiscal Year 2000 and eliminated the need to create new contract vehicles to execute procurement, NET, and CLS required by the ONS.

The first issue was to determine the suite of equipment to field to the teams. The mission of the team was to conduct TIC detection operations in confined spaces. In order to enter confined spaces, the teams required the appropriate level of protective garments, respiratory protection, and to have established sampling, and team decontamination procedures.

Deciding on the suite of equipment was easy. The JPM-IP has had experience in procuring this type of equipment from commercial sources. National Fire Protective Association (NFPA) and the National Institute of Occupational Safety and Health (NIOSH) standards were used to identify the appropriate personnel protective and respiratory equipment. The composition of the sets were decided in December 2003. The first NET was conducted in January 2004. At that point, the equipment had not been fielded to the trained team because the entire equipment set was not ready for fielding.

The NET was a 10-day course of instruction that focused on the proper and safe use of the equipment, sampling procedures in confined spaces, and team decontamination procedures.

The deployment schedule of the teams that were to receive training became the driving force in the NET schedule. The pre-deployment schedules did not allow time for the NET in the Continental United States (CONUS). Training and fielding instead had to be done in Iraq and Kuwait. This increased the level of difficulty, the costs of training, the costs of shipping the equipment, and the risk of equipment being lost in shipment.

The first two aspects that increased the costs to the program are inter-related. The PV contract contained the flexibility to meet the requirement. However, contractors had to be screened for deployment to theater. The contractors were required to attend the CONUS Replacement Center (CRC) Course for five days. Attendance at the course was required within 30 days of deployment. This was a substantial cost driver and

increased the cost of NET by more than $8,000 per trainer. Four trainers were used for training overseas.

To facilitate unit availability, a four-week period to conduct training for the units in Iraq and Kuwait was established. Fourteen teams were trained. The instructors traveled to Iraq and were hosted by Combined Joint Task Force (CJTF) 7. Ten teams received training on schedule, but events in Iraq caused four teams to drop out of training. This would require another session of training in Iraq when the units were available. The 10 trained teams were then furnished with equipment.

The original contractors had returned home, and a new set of instructors were needed to train the final four teams. For those who maybe thinking about sending contractors to a hot operational theater, let me mention some costs that make this expensive. There is a law named the Defense Base Act which defines the levels of insurance required for contractors support Armed Forces operations in a hot area. The cost of this insurance is high. Only a few insurance companies provide this protection. All instructors had to attend another CRC course. The cost of training the four additional teams jumped by almost $65,000. The Defense Base Act insurance requirements also increased the costs of the CLS.

The equipment was shipped to the theater via normal Department of Defense (DoD) transportation processes. Equipment was packaged at Charleston and shipped via military aircraft to Iraq. Pallets destined for the TIC teams entered the overall shipping processes. A portion of the equipment was lost. Much of the losses were mission critical items and had to be replaced quickly. This increased the overall cost of the equipment. Although we were successful in finding much of the misplaced equipment, some were never found.

The life cycle management for the equipment needed to be flexible and responsive. We understood the preventative maintenance and inspection schedules required for the equipment. However, we did not have any information on operational usage planned for the units. We had to anticipate anything from only training equipment attrition to serge operations. We could not rely on vendors to provide "just-in-time" logistics support. Critical items required long lead times for manufacture and there were many customers that required the equipment. The availability of covered storage in Iraq was very limited.

With these constraints, JPM-IP developed a strategy for logistics support based on an pool of equipment located in Iraq, a pool located INCONUS that would feed the Iraq-based pool, and two contractor personnel in Iraq.

The CONUS pool is located at Camp Smith, NY. The JPM-IP office had been supporting the Homeland Security Department, Office of Domestic Prepared (ODP) Prepositioned Equipment Pod (PEP) Program for the last two years. The PEP program manages first responder type equipment at various locations throughout the United States. The purpose of the PODS is to rapidly re-supply first responders in the event of a terrorist attack. The PEP program developed out of lessons learned during the response to the attack on the World Trade Center (WTC). The life cycle support of the PODS is managed by the Chief Downey National Logistics Activity at Camp Smith, NY (Chief Downey perished in the WTC). The NLA personnel had the skills and experience needed and made a good fit for the CONUS based equipment pool.

Two contractors are permanently assigned to man the Iraq based equipment pool. They maintained the equipment in the pool, provided organizational level maintenance to the fielded teams, and received and shipped equipment. Inoperable equipment is shipped back to the NLA and replacement is sent to Iraq to retain the pool readiness at 100 percent.

The JPM-IP Program Office has provided select units the capability to address threats posed by TICs. The teams are trained to safely enter confined spaces, take samples, and determine if there are toxic substances present. The individual equipment provides the Soldier protection against toxic substances that military developed protective clothing and respiratory equipment cannot provide. We have developed a logistic support structure that is flexible and responsive to low levels of equipment attrition or can address any surge operations. The Program Office is currently providing NET for units that will deploy in support of Operation Iraqi Freedom III. This training will be completed in March 2005.

Battelle Memorial Institute Photo

Civilian First Responders typically wear orange, which signifies the Level A Ensemble (fully protective) dress while the green signifies the Level B Ensemble.

Battelle Memorial Institute Photo

Military First Responder dressed in Level A Ensemble places a dirt specimen into a sample cup.

COLLECTIVE PROTECTION

Compiled by: Jean Smith, Robert White, & Mike Boruch

Chemical, Biological and Radiological Defense for the Joint Services

It's 3:00 A.M. in Fallujah. Troops are conducting operations. Suddenly, from outside the command tent, they hear the dreaded alert. "Gas, gas, gas!" Well-trained personnel automatically grab for their protective equipment, then suddenly relax, realizing there is no need to suit up, their tents are equipped with Collective Protection (CP). CP is a systematic approach for protecting personnel and equipment from airborne Chemical, Biological, and Radiological (CBR) contaminants, whereby persons in the space (e.g. soft or hard shelters, buildings, vehicles, etc.), can effectively continue "business as usual" during a CBR event without restrictive masks or protective overgarments.

Research, Development and Acquisition (RD&A) and life-cycle management oversight of Collective Protection systems and equipment is the mission of the Joint Project Manager for Collective Protection (JPM CP). The JPM-CP program office oversees four RD&A programs: Joint Collective Protection Equipment (JCPE), Collective Protection System (CPS) Backfit, Chemical and Biological Protective Shelter (CBPS) and CP Field Hospitals. Additionally, the JPM CP provides assistance and oversight to various efforts across Department of Defense (DoD) in installing collective protection at fixed facilities.

The JCPE Program consolidates planned improvements to fielded CP systems across all four DoD services into one joint product improvement program for addressing deficiencies, improvements and cost saving initiatives. JCPE has developed tent liners, extended life filters, a lighter, more energy efficient Environmental Control Unit (ECU) and improved airlocks.

The CPS Backfit Program provides filtered air to designated zones to protect personnel against Chemical, Biological and Radiological (CBR) contamination onboard U.S. Navy ships. Under this program selected shipboard spaces are sealed, provided with adequate airflow for over pressurization, protective filtration, and access. Mission-critical operations can then proceed in a CBR environment.

The CBPS is the primary shelter for ground-based tactical medical units where high mobility and rapid deployability are major requirements. The CBPS provides a self-contained environmentally controlled emergency facility for Forward Surgical Teams (FST) in a CBR contaminated area. CBPS consists of a High Mobility Multipurpose Wheeled Vehicle (HMMWV) with a rigid-wall Lightweight Multipurpose Shelter (LMS) attached, and a self-deploying tent that deploys from the rear of the LMS within 20 minutes.

CP-Field Hospitals are comprised of the Army's Chemically Protected Deployable Medical System (CP-DEPMEDS), the Navy Fleet Hospital and the Air Force's Collectively Protected Expeditionary Medical Support system (CP-EMEDS). These hospitals - complete with surgeries, x-ray, dental, and a CB-protected water supply system - are heated or cooled and kept at a positive pressure with filtered air to provide a hospital staff the ability to treat and house patients in a "shirtsleeve" toxic-free environment.

NEAR TERM FOCUS

The overarching near-term focus for JPM CP is to consolidate and improve logistics support of currently fielded systems across the services and incorporate lessons learned and new technologies into existing systems and programs, thereby enhancing warfighter ability to maintain mission effectiveness in a CBR environment.

Products developed by JCPE in the warfighters' hands include liners for insertion into the Modular General Purpose Tent System (MGPTS) and CP-EMEDS, the Lightweight Environmental Control Unit (LECU) and the Collectively Protected Expeditionary Latrine (CPEL). Current JCPE efforts include developing liners for the Army's configuration of the Alaska Small Shelter System (SSS) and the Air Force's Large Capacity Shelter (LCS), compatibility testing of the Tunnel Airlock for Litter Patients (TALP) with the CP-MGPTS and performance testing of various gas-particulate filter improvements.

Various other products in development or testing are a result of lessons learned and feedback from Operation Iraqi Freedom (OIF). Prototypes produced include a CBR filter-blower remote start switch for use inside the tent, a dust-filtered fresh air intake that automatically closes when the CBR blower comes on, and new bulkhead

entrances, which allow for more efficient transition to a protective posture.

The next CBPS procurement will incorporate a Self-Powered Environmental Support System (SP-ESS) which was developed under the direction of a combined contractor and government Integrated Product Team (IPT). The SP-ESS features a lightweight diesel engine that drives a Permanent Magnet Generator and bank of inverters that power all systems for CBR and ancillary components.

Next generation CP-DEPMEDS systems include the Future Medical Shelter System (FMSS). A building block approach for Combat Support hospitals, FMSS features a rigid-wall operating suite with two 10 bed soft-shelter wards that can be assembled within minutes. Prototypes are under development by industry.

US Navy Photo

Within DoD laboratories and engineering organizations, technology based efforts are underway to advance CP capabilities for the warfighter. A partial list of these efforts includes improved liner and tent material development, closure and seal development for tent systems, airlock technology development, and advanced adsorbent development.

Tent fabric efforts include investigating low temperature processible flouropolymers, self-decontaminates, and nanocomposite platelets that can be impregnated into fabric or fabric coating, eliminating the additional carrying load and set-up time for liners. Protective enclosures are being developed with improved air-flow processes to reduce purge time required between ingress/egress. Filtration system improvements are being investigated under the JCPE Program. Filters incorporate three stages of protection; a pre-filter which removes large particle-size dust; HEPA elements, which remove sub-micron-size biological agents and radioactive particles: gas filter elements, which use specially activated carbon to adsorb toxic warfare agents in vapor or aerosol form. Toxic Industrial Chemical (TIC) Adsorbent Media is under development and being tested in existing filters. A study will assess filter bed compositions to enhance filtration capabilities of current single-pass filters. The program is testing prototypes that have a deeper carbon bed, reduced pleat height, and mini-pleats that limit media movement and prevent self-binding.

The Joint Expeditionary Collective Protection (JECP) program, as described in the approved Initial Capability Document, is a new acquisition program which will address expeditionary collective protection gaps identified by the Joint Requirements Office's (JRO) recent CBRN Baseline Capability Assessment. The JECP program as well as other disciplines under the cognizance of the JPEO CBRN will use the findings of Technology Readiness Evaluations (TREs) to identify mature technologies. TREs evaluate maturity and applicability of Government, industry, and academia developed technologies. Specific capability improvements sought include reduced system and component footprint, volume, and weight; reduced power consumption, increased protection performance against chemical (including TICs), biological, and radiological contaminants; reduced setup and tear down requirements (time, manpower, equipment resources); increased personnel entry and exit rate to and from a TFA; and reduced logistic support measures (increased service life, service life indications, reduced maintenance, etc.) Technology areas of a 2005 TRE include: air purification, alternate liner, tent materials, and support systems (i.e., quick erect/setup technologies for tents, facilities and environmental control systems with integrated filtration). Technologies and products determined to meet Key Performance Parameters, as identified within the Capability Development Document, will be incorporated in Increment 1. An FY08 TRE will evaluate mature technologies in advanced textiles, novel airlock purge processes, regenerative filtration, catalytic oxidation, residual life indication, and enhanced aerosol/particle removal. A third TRE is planned for FY-11.

FUTURE FOCUS

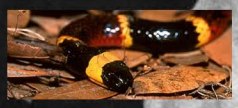
The long-term focus of JPM CP centers on the following emerging products and technologies: novel and alternative air purification processes, new and improved chemical adsorbent and particulate filtration media (including regenerative strategies) that can be integrated into existing single pass CBR filter assemblies, CBR barrier materials for use as CBR resistant tentage, liners or other enclosure systems that can provide a toxic free area (TFA), quick implementation collective protection equipment and processes, advanced contamination control area and airlock technologies that integrate current decontamination processes, and complete packaged collective protection solutions.

JPM CP is currently working with the Joint Science and Technology Office to align efforts between the acquisition community and the Science & Technology community. Among future systems in which JPM ColPro will seek incorporation of standardized components and technologies are Littoral Combat Ship (LCS), Future Combat Systems (FCS) and the Expeditionary Fighting Vehicle (EFV).

The LCS will take advantage of the newest generation hull form and tailored, modularized combat systems package designs which will enable the LCS to perform various missions in future hostile environments.

Protecting the Individual

By Mr. Salvatore Clementi, Senior Engineer for Individual Protection Systems




Poisons Contaminate Food — 600 B.C.

Snakes Used to Poison — 190 B.C.

Catapults Toss Diseased Corpses Over Castle Walls — 1400

Protective Mask Concept — 1850

WWI (Edgewood) — 1918

The use of biological weapons as a means of waging war dates as far back as the sixth century B.C. when food poisons and contaminated corpses were used to infect opponents. Hannibal hurled earthen jars filled with venomous snakes into enemy ships in 190 B.C. During World War I (WWI), German troops conducted nearly 200 chemical attacks by releasing chlorine gas from thousands of cylinders. These attacks killed tens of thousands of troops and opened gaps in Allied lines as wide as five miles. Over the past 20 years, the threat of chemical/biological (CB) warfare has increased as some countries and terrorist networks continue to work on offensive applications and delivery systems of CB agents. There is intense concern about enhancement and proliferation of offensive programs in countries hostile to western democracies as well as potential terrorist use of weapons of mass destruction (WMD) to threaten military and civilian populations. Since U.S. Forces operate in areas where the capability exists to employ CB agents, individual protective equipment and mitigation procedures are more important than ever.

HISTORY OF INDIVIDUAL PROTECTIVE EQUIPMENT

The development of protective equipment for use against toxic CB agents parallels the development of CB weapons themselves. Leonardo da Vinci wrote the earliest recorded gas mask proposal in the 15th century. Da Vinci envisioned a fine cloth dipped in water for defense against a sulfide/arsenic toxic weapon he proposed. The conventional protective mask concept appeared in the mid-1800's. Due to U.S. neutrality at the outset of WWI, few preparations were made for CB warfare. However, by the end of the war, the U.S. had standardized gas mask design and produced more than 3 million masks for U.S. troops.

In addition to gas masks, WWI saw the appearance of the first chemical protective suits. Unlike previous suits that were completely impermeable, this suit allowed the escape of perspiration from the body. The material consisted of cotton sheeting coated with a solution of gelatin, glycerin, and zinc-sulphate and was treated with formaldehyde to make the gelatin water insoluble.

JPM-IP MISSION

The JPM-IP has the mission to develop, test, procure, and field Individual Protective Equipment (IPE) to provide the warfighter the best protection at the right time, at the right place, at the right price. JPM-IP manages the life cycle of all CB IPE worn by the warfighter; this includes suits, footwear, gloves, masks, and some test items. Due to JPM-IP's in-depth understanding of CB agent threats and personnel needs, today's IPE provides better protection than previous equipment and is far more comfortable to wear. By understanding the complex relationships between mission accomplishment, personnel safety and threat scenarios, the JPM-IP is able to design the right level of protection and comfort to help the warfighter accomplish the mission.

in Chem/Bio Warfare

When initially fielded, most equipment is not the perfect solution, but represents an initial capability based on the best available technology. The evolving threat environment dictates the necessity for continual improvements. Although protection (i.e. safety) is of paramount importance, incremental improvements in comfort, weight, durability, heat stress, wear ability, and donning and doffing-ease must be evaluated to ensure they do not negatively impact protection. This approach ensures rapid fielding of the state-of-the-art with pre-planned efforts to incorporate improvements as they mature. Incorporation of new technologies at various points in the product life cycle allows an evolutionary development and provides continual product upgrade.

FIELDED IPE SYSTEMS JSLIST ENSEMBLE

The heart of today's military CB protective ensemble is the Joint Service Lightweight Integrated Suit Technology (JSLIST). The JSLIST garments are worn with protective gloves, footwear, and a field protective mask to create a state-of-the-art CB protective ensemble. The system that provides the best percutaneous and respiratory protection against CB warfare agents available to any warfighter today. The JSLIST is a two-piece, front-opening garment with an integral hood, bellows-type pockets, high-waist trousers, adjustable suspenders, adjustable waistband, and waist-length jacket. This protective garment is made of an outer shell that is a mix of nylon and cotton poplin rip-stop material with a durable water repellant finish. The inner-liner absorbs and contains the chemical agent; this layer consists of activated carbon laminated to a backing that is bonded to a tricot knit. The JSLIST garment (coat and trousers) weighs five to seven pounds depending on the size. Users include the Army, Navy, Air Force, Marine Corps, and specialized units outside the Department of Defense (DoD).

The JSLIST garment can be worn for up to 45 days with six launderings and provides 24 hours of protection against battlefield concentrations of all known CB agents once contaminated. When compared to previous protective garments, the JSLIST provides reduced weight, increased durability, improved fit, enhanced suit closures, and a reduction in heat stress for the wearer. Each component (suit, boots, gloves, and mask) is based on state-of-the-art material technologies that have undergone extensive user evaluation as well as field and laboratory testing.

In 2006, the Joint Protective Aircrew Ensemble (JPACE) will be fielded to replace the existing CB protective suit for aviators and aircrew. JPACE is a one-piece, fire-resistant suit offering improved CB protection, reduced heat-stress, and allows an increased number of laundering cycles over existing suits. Like the JSLIST garment, JPACE is constructed with an inner layer of activated carbon in a urethane matrix that absorbs and contains chemical agents. When contaminated, JPACE provides 24 hours of CB protection after 30 days of wear.

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Protecting the Individual

MASKS

Field protective masks used with the JSLIST ensemble include the M40 series mask and the MCU-2/P series mask. The M40 series mask consists of a silicone rubber face-piece and a replaceable face-mounted filter canister that can be mounted on either the left or right side. Paramount aspects of the M40 are user protection level and comfort. Field protective masks are designed to protect the user from battlefield concentrations of all known chemical warfare agents as well as biologicals and radioactive particulates. Key features include a wide field-of-vision, flexibility at extreme temperatures, weather and ozone resistance, ease of cleaning and maintenance, a voice amplifying device, and a drink tube. M40 Mask variations include the ability to interface with armored vehicle communication systems.

The MCU-2/P mask is constructed of a one-piece urethane lens and a silicone rubber facepiece. The one-piece lens offers a large, unobstructed field of view. Dual canister mount accommodates both left- and right-handed wearers. The voice-mitter system for the MCU-2/P provides the option for voice communication through a microphone hookup, located over the mask's mouth area.

Army aviators use the M45 (general aviation mask) and the M48 (Apache helicopters mask), while Navy and Marine Corps aviators use the AR-5 mask, and the Air Force uses the Aircrew Eye and Respiratory Protection (AERP) mask.

The Joint Service General Purpose Mask (JSGPM) is to be fielded in 2006. The JSGPM is designed to replace the M40 and the MCU-2/P masks and will reduce weight, bulk and breathing resistance. In addition, the JSGPM will have a wider field of view and improved ability to interface with current and future protective clothing. The Joint Service Aircrew Mask (JSAM) will also be fielded in 2006 and will replace six existing aircrew masks in DoD inventory. In addition to providing CB protection, JSAM will allow in-flight donning and doffing and will provide positive pressure breathing to protect against fatigue and loss-of-consciousness during rapid acceleration in high performance aircraft.

FOOTWEAR

Although several types of protective footwear have been employed with chemical protective suits, the Multipurpose Protective Overboot (MULO) is the current CB protective footwear solution employed by the Army, Navy, Air Force and Marine Corps for the JSLIST ensemble. The Army and Marine Corps also use the green or black vinyl overboot (GVO/BVO). Both the MULO and the GVO/BVO are designed to provide up to 24 hour CB protection, upon exposure, after 30 days of wear. The MULO is a single-piece design with webbed straps, side-to-back plastic buckle closures, and improved tread design. The MULO is designed for daily wear in the water, mud, and snow. The MULO's agent resistance is not degraded by exposure to petroleum, oils, lubricants (POLs) and decontaminants; hence, the MULO has the capability to be decontaminated to operationally safe levels after CB exposure. The MULO provides improved durability, enhanced compatibility, and comfort over the GVO/BVO.

in Chem/Bio Warfare

The Acton Lightweight Overboot (ALO) is a Commercial-off-the-Shelf (COTS) butyl blend that fulfills an urgent need by the U.S. Navy for a multi-size fit, reduced storage volume CB protective boot. The ALO is an improvement over the MULO and GVO/BVO because it does not take a "set" when rolled or folded. The ALO is an evolutionary approach to the Alternate Footwear Solution (AFS). AFS aims to minimize packaging volume, reduce weight, improve traction and reduce "set." Concurrent with the AFS program, work is underway to incorporate CB protection into a sock or boot liner, this is the Integrated Footwear Solution (IFS). The ultimate aim of AFS and IFS is to integrate CB protection into current military footwear.

GLOVES

The chemical protective glove consists of an outer glove for chemical protection and an inner glove for perspiration absorption. The outer glove is made of impermeable butyl rubber and the inner glove is made of white cotton. The gloves come in three thicknesses: 7, 14, and 25 mil. The 7-mil glove is used by medical personnel, teletypists, electronic repair personnel, and others who require tactility and touch sensitivity and will not expose the glove to harsh treatment. The 14-mil glove is used by aviators, vehicle mechanics, weapons crews, and personnel whose tasks require some touch sensitivity. Personnel who perform close combat and other heavy labor use the 25-mil glove. Butyl gloves protect against liquid chemical agents and vapor hazards and can be decontaminated and reused.

The Joint Block 1 Glove Upgrade (JB1GU) fulfilled an urgent United States Special Operations Command requirement for a glove with increased tactility and dexterity. JB1GU provides protection from liquid, vapor and aerosol CB hazards equal to or better than the current glove. The JB1GU offers 24 hours of protection in a contaminated environment and is durable up to 14 days. The JB1GU also achieves most requirements in the JSLIST ORD and serves as an evolutionary approach to the Joint Block 2 Glove Upgrade (JB2GU). JB2GU will add flame resistance, 30-day protection/durability, and will replace all butyl rubber gloves.

OPERATIONAL WEAR

The chemical protective ensemble items are donned based on Mission-Oriented Protective Posture (MOPP) levels designated by the commander. MOPP is a doctrinal procedure that allows protection levels to increase or decrease depending on the existing mission-specific threat. When the threat level demands complete percutaneous and respiratory protection, MOPP 4 provides total encapsulation. In MOPP 4 the JSLIST garment is worn so that the trouser legs are fastened over the tops of the protective boots, the sleeve cuffs are fastened over the gloves, and the hood is tied securely around the edge of the mask. This CB protective ensemble completely encloses the wearer and provides head-to-toe skin, respiratory, and ocular protection.

DEVELOPMENTAL PROJECTS

To optimize mission-effectiveness, it is important that IPE design consider not only protection but also comfort. Placing a warfighter in MOPP 4 adds up to 14 pounds to the warfighter's existing load. Consequently, MOPP levels must be balanced against workload for troops to

(Con't pg. 20)

remain effective. The commander must consider the potential for mission impairment caused by added weight, heat stress, dehydration and physical exertion in wearing the full ensemble. This additional burden (for both warfighter and command) highlights the need for continuing IPE improvement. Clearly, cooling technologies are needed to improve wearer comfort and enhance mission success. Novel materials and innovative design concepts must be exploited to achieve improvements in performance and wear-ability. Specific product capability enhancements are being sought including; cooling technology (systemic or material); novel adsorbents (e.g. nanoparticle technology, toxic industrial chemical (TIC) removal); self–decontaminating fabrics and polymers (e.g. reactive materials); novel closure concepts; novel integration concepts; alternate source qualifications; and improved filtration technologies.

As part of the responsibility for total product life cycle, JPM-IP seeks to insure the supply of IPE by qualifying alternate production sources that will provide equal or better performance. Therefore, program efforts are underway to identify alternate sources. Technology insertions and continual product upgrade are integral to this concept. Future improvements in CB protective clothing will emphasize cooler, lighter-weight garments with integrated CB protection that ultimately serves as the standard duty uniform.

JPM-IP also seeks to expand the comfort and protection capabilities of existing masks and mask filters that will also protect from TICs. Lighter, less bulky, self-decontaminating masks that are fully integrated into other IPE are envisioned. In addition, less-bulky filters and extended filter life are desired to enhance wear-ability and user comfort. Another desired comfort enhancement is a filter having reduced breathing resistance that will reduce the amount of work required to breathe.

The next generation CB glove will have improved durability, tactility, dexterity, POL resistance, comfort, and will be able to be used in all applications (ground, shipboard or aviation). Next generation footwear will provide extended protection and wear times with improved traction and will be able to be donned and doffed while wearing gloves, mask and suit. The JPM-IP will continue to place emphasis on integrating CB protection (footwear, hand-wear and clothing) into the standard duty uniform.

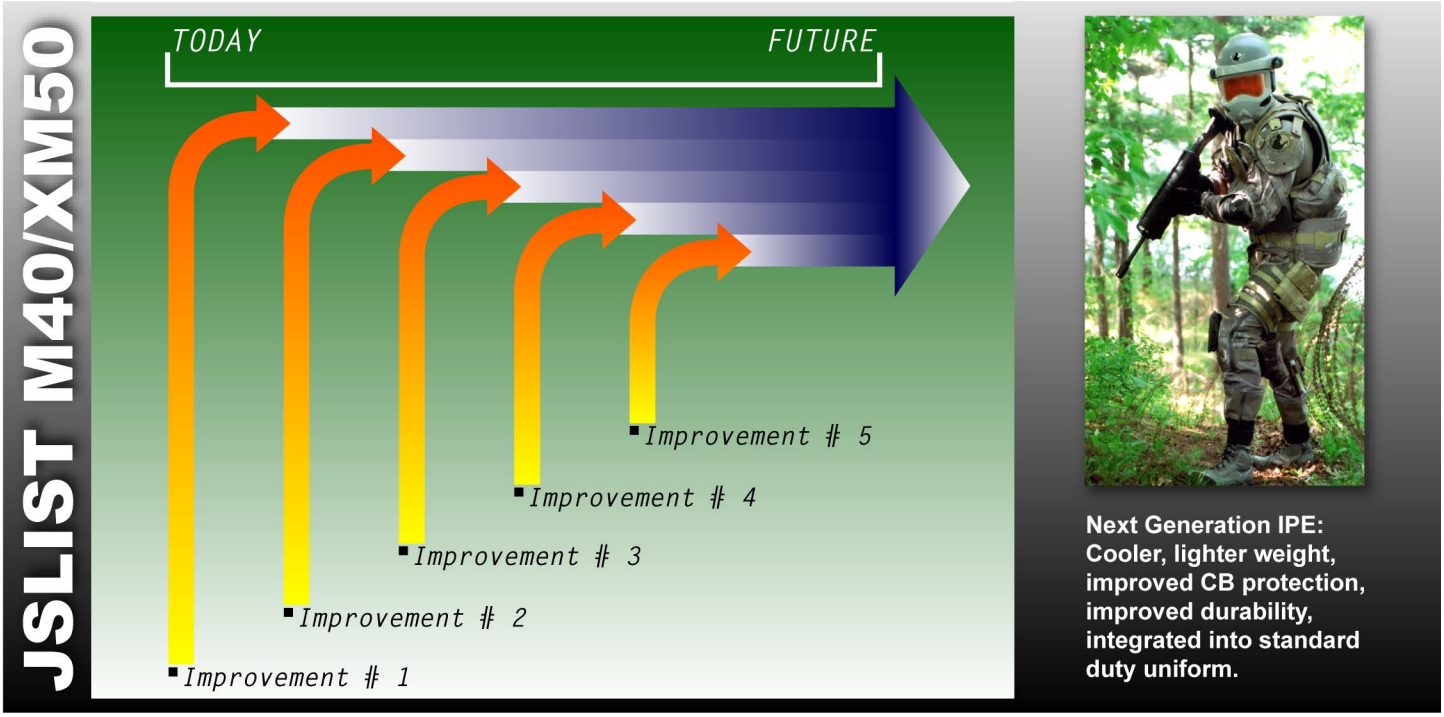
PARTNERSHIPS

JPM-IP's Science and Technology program pursues technologies that have the potential to significantly enhance IPE capabilities. The Joint Science and Technology Office of the Defense Threat Reduction Agency, effectively facilitates science and technology for the protection, usability, and comfort of the warfighter. JPM-IP has existing partnerships with government laboratories and CB defense centers that provide excellent test and development support.

Achieving substantive performance improvements often requires extended time frames and large dollar investments. To shorten development timeframes and leverage development dollars, JPM-IP seeks to actively collaborate with commercial industry specializing in specific technology areas. Specific areas of interest include those that can improve IPE wear-ability, protection and/or assurance of supply.

Industry has been pursuing technological advances in these areas, and some are ready for technology insertion into military equipment and commercialization. Establishing and maintaining partnerships with commercial industry augments the DoD as well as the commercial sector by accelerating technology and driving product improvements to provide improved protection for the warfighter.

The Mickey Mouse Mask was designed for children with the cooperation of Walt Disney. Although never standardized, approximately 1,000 of the masks were completed during World War II.



Next Generation IPE: Cooler, lighter weight, improved CB protection, improved durability, integrated into standard duty uniform.

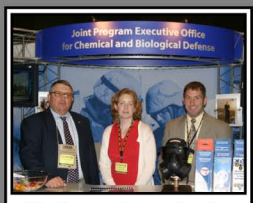
JPEO-CBD

Supporting Our Warfighters

US Coast Guard Innovation Exposition

DoD Chem-Bio Advance Planning Briefing for Industry

Sea-Air-Space



Air Force Association

Modern Day Marine

AUSA Winter Symposium

JPEO-CBD invites you to support the warfighter. Visit our display at these locations.

CONFERENCES 2005

Special Operations Low Intensity Conflict (SO/LIC) Exposition	February 2-4	Washington, DC
Association for US Army (AUSA) Winter Symposium	February 16-18	Ft. Lauderdale, FL
Society of Armed Forces Medical Laboratory Scientists (SAFMLS)	March 15-16	Jacksonville, FL
Sea-Air-Space	March 22-24	Washington, DC
Diminishing Manufacturing Sources & Material Shortages	April 11-15	Nashville, TN
DoD Chem-Bio Advance Planning Briefing for Industry	April 25-26	Washington, DC
Force Protection Equipment Demonstration	April 26-28	Quantico, VA
US Coast Guard Innovation Exposition	May 2-5	Santa Clara, CA
Association for US Army (AUSA) Medical Conference	June 27 - July 1	San Antonio, TX
Air Force Association	September 11-14	Washington, DC
Modern Day Marine	September 13-15	Quantico, VA
Association for US Army (AUSA) Annual Meeting	October 3-5	Washington, DC

The Joint Service Mask Leakage

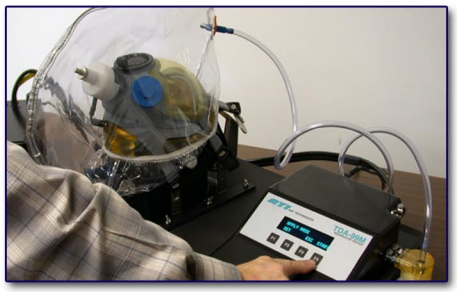
Helping To Ensure Protective

By Mr. Lowry Brooks, Product Manager, JSMLT

The Joint Service Mask Leakage Tester (JSMLT) is a portable tester that combines the capability of the entire family of previous Defense Chemical Test Equipment (DCTE) for protective masks. The JSMLT is capable of determining serviceability, proper fit, and identifying defective components of all current negative pressure protective masks. The tester will help the users obtain confidence in their protective masks by conducting serviceability and fit factor tests. Most importantly, the JSMLT will prove an indispensable tool to verify the effectiveness of a unit's Preventive Maintenance Checks and Services (PMCS) program.

Numerous tests are performed throughout the lifecycle of a protective mask. Quality assurance and acceptance testing are performed during production at the factory. This testing addresses protective mask serviceability and conformance with design requirements. Once fielded, protective mask testing requirements are directed by the individual Services. Two types of testing associated with CB protective masks are serviceability testing and fit factor testing. The most common serviceability test performed on the protective mask is PMCS. The Army and Marine Corps conduct fit factor testing utilizing the M41 Protective Assessment Test System (PATS). On a limited basis, selected units have their CB protective mask inspected and tested by the Joint Equipment Assessment Program (JEAP). These tests are primarily serviceability tests but can include fit testing if requested by the unit undergoing inspection.

Serviceability testing verifies the integrity of the overall mask and its components. Current PMCS is identified in the protective mask's technical manual and the results are primarily based on the experience and judgment of the person performing the inspections. The assigned protective mask user does not have to be present to conduct serviceability tests.



Undergoing Mask Leakage Test

JSMLT Connected for Drink Tube Test

Drinking Tube System Test

Fit factor testing is performed when a mask is issued to an individual and periodically thereafter as directed by the service. The objective of fit factor testing is to quantify the fit of the protective mask to the assigned user's face. Fit factor testing should only be conducted on a known serviceable mask. It ensures that a specific mask will or will not fit a specific person at the time the test was performed. The fit testing program does not ensure the serviceability of protective masks. Thus, if a poor fit factor is identified it may be difficult to determine if the problem is caused by an unserviceable mask or a poor fit.

Protective mask operational readiness is an organizational responsibility. However, current capabilities for conducting organizational level serviceability and fit factor testing are limited. The majority of the serviceability testing is protective mask PMCS which is very subjective and greatly impacted by the experience or inexperience of the inspector.

The JEAP conducts serviceability inspections every year but the number of inspections is limited due to personnel availability and test equipment. Each JEAP team consists of approximately 10 people and a tractor-trailer full of legacy test equipment. The currently fielded M41 PATS is limited to fit factor testing. Thus, units are limited in their ability to verify mask serviceability and to verify the effectiveness of their established PMCS program.

Prior to the JSMLT, the existing suite of DCTE available at the organizational level consisted of the fielded M41 PATS. Four legacy serviceability test devices exist in

TESTER (JSMLT)

Mask Readiness

depot and the JEAP. There are numerous shortcomings to existing systems:

- The complete suite of DCTE is not available for deployment at the organizational level. Five systems are required to accomplish the full suite of mask serviceability and fit factor tests.
- The M41 PATS is not capable of identifying defective or unserviceable components of protective masks.
- Current legacy test equipment requires operators to be certified annually.
- The JEAP does not posses the assets to conduct protective mask serviceability testing for every organization within the U.S. military.

The JSMLT tests a protective mask for defects and fit by measuring the performance of the mask against known performance standards. For the Mask Leakage Test and Quantitative Facefit Test, the JSMLT measures the amount of leakage into the mask when externally challenged with a polydispersed aerosol. For Drink Tube and Outlet Valve testing, the JSMLT measures air flow and air leakage. The JSMLT uses the same pass/fail criteria as the legacy DCTE.

The JSMLT test capabilities are brought forward to the Organizational level from the Intermediate and Depot levels. Thus the users now have instant feedback relative to mask fit and serviceability. The JSMLT can be used in garrison and deployed operations.

The Joint Project Management Office – Individual Protection is utilizing commercial-off-the-shelf technology to acquire the JSMLT. Air Techniques International (ATI), located in Owings Mills, MD, has been selected to manufacture the JSMLT. Several JSMLTs have been procured under Low Rate Initial Production and have undergone a rigorous battery of laboratory, environmental and operational testing. Numerous product improvements have been implemented into the TDA-99M, which primarily enhanced the ruggedness and reliability of the unit.

The Full Rate Production Milestone Decision Review is scheduled for February 2005. The USMC, USAF and USN will procure the JSMLT, with the Army showing increased interest in the program. Procurement will take place through FY09 to provide the full Acquisition Objective of 2,450 units. Technology insertions will be incorporated to ensure the JSMLT is compatible with future protective masks.

The JSMLT represents a critical component of a comprehensive mask testing regimen for the services. It will provide organizational units the capability to accurately test and maintain protective masks throughout their life cycle, thereby critically enhancing protective mask operational readiness. For the first time, units will have the capability to quantitatively and qualitatively test protective masks during or following long storage periods, after field usage, after mask cleaning, after mask repair, and to verify correct PMCS.

When fielded, the JSMLT will provide a capability currently not available at the organizational level. The JSMLT can be used in garrison and deployed operations. The JSMLT is capable of determining serviceability, proper fit, and identifying defective components of all current negative pressure protective masks. The JSMLT will help the users obtain confidence in their protective masks by conducting serviceability and fit factor tests. Most importantly, the JSMLT will prove an indispensable tool to verify the effectiveness of a unit's PMCS program.

The JSMLT is Capable of Performing the Following Tests

JSMLT TESTS	DESCRIPTION	DEPOT EQUIPMENT
Mask Leakage Test Overall	Mask Leakage -- Aerosol	M14
Mask Test with Hose	Hosed Mask Leakage -- Aerosol	M14
Leakage Isolation Test	Leakage is Located by 'Probing'	M14
Drink Tube Flow Test	Drink Tube Blockage Measured	Q179
Drink Tube Seat Test	Drink Tube Valve Tested	Q204
Drink Train Test	Drink Tube Leakage Measured	Q204
Outlet Valve Test	Outlet Valve Leakage Measured	M4A1

JSMLT TESTS	DESCRIPTION	UNIT EQUIPMENT
Quantitative Fit Factor Test	Fit of Mask to Face Measured	M41 PATS

Course Trains "Select Few" Biological

-- By Caree Vander Linden, USAMRIID PAO

The narrow gravel path leads to a cluster of mobile tactical shelters at Fort Detrick's "Area B," 400 acres of farmland just off Rosemont Avenue. A brown sign reads, "Field Identification of Biological Warfare Agents (FIBWA) Laboratory Training Site." Inside, the air conditioning is blasting while Top 40 music plays from a portable stereo atop a file cabinet. Two laboratories, each with four workstations, adjoin a central International Standards Organization (ISO) that serves as a conference room.

In this nondescript setting, eight students will learn to set up, maintain, and operate a deployable laboratory under field conditions. The four-week, hands-on FIBWA course offers training in the most advanced field technologies for confirmatory identification of biological warfare (BW) agents. Developed by the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), FIBWA is the only course of its kind in the entire Department of Defense.

According to Mark Wolcott, Ph.D., head of the Field Operations and Training branch within USAMRIID's Diagnostic Systems Division (DSD), FIBWA grew out of the need for battlefield detection of BW agents. As field detectors were developed and deployed, the ability to confirm what the detectors were "seeing" was crucial to add confidence for battlefield, medical and National Command Authority decisions. The requirement for a deployable BW agent confirmation laboratory was born.

Since the FIBWA course was first offered in 1999, nearly 200 students from all three services and other government agencies have attended. To ensure that the training stays on the cutting edge, concepts of operations and diagnostic materials, equipment and technology are continually evaluated and transitioned into the field.

Bill Dorman, a former Army Sgt., is the FIBWA training coordinator who on board during the first course in 1999. At that time, USAMRIID had put together a laboratory/training package at the request of Central Command (CENTCOM), which wanted its own full-time lab capability.

The demand grew, and there are now six laboratories under five major commands. CENTCOM, Pacific Command (PACOM), Center for Health Promotion and Preventive Medicine (CHPPM) and Medical Command (MEDCOM) each have one laboratory; Forces Command (FORSCOM) has two.

"The course is unfunded," says Dorman, "so everyone who comes has to pay their own way." The cost—$7,000 per student for the four-week course—means "we get a select few," he adds.

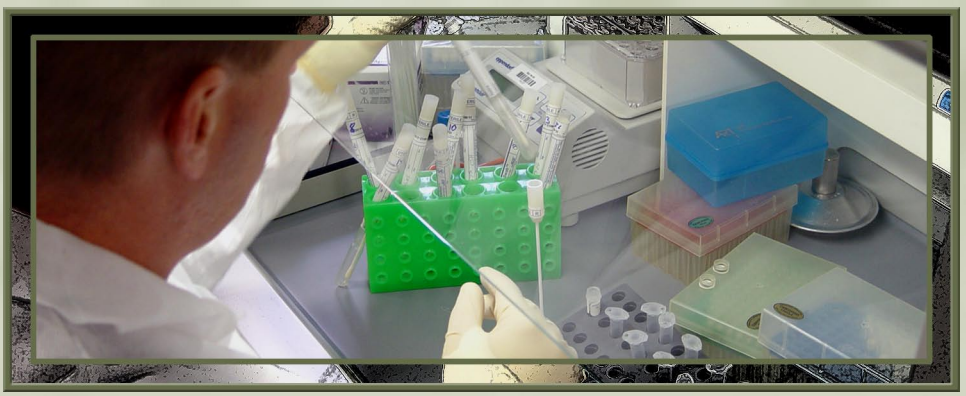


Photo by Bill Dorman, (USAMRIID)

Capt. Jason Barnhill prepares environmental swabs for DNA extraction.

Hands-On Training

The first two days are spent largely in the classroom. Students receive an overview of the history of biological warfare, along with briefings on laboratory concepts, current techniques, and field laboratory operations. The fundamentals of biological safety are also introduced. Next, they will spend nine days learning how to extract genetic material - DNA and RNA - from multiple sample types, along with a technique called polymerase chain reaction, or PCR, which is used to identify the extracted DNA and RNA.

"Operation Desert Storm taught us that we need to have sensitive and specific technologies in a deployable laboratory, capable of analyzing both biomedical and environmental samples."

... Maj. John Scherer, Chief of DSD

PCR was developed in the 1980s and quickly became an indispensable tool in the field of molecular biology. Unlike standard methods of clinical microbiology—which involve growing organisms in culture and waiting as many as several days for the results—PCR yields reliable results in just 2-4 hours. Using even the tiniest fragment of genetic material present in a sample, PCR enables large numbers of copies of a particular gene to be produced, thus making definitive identification possible.

"Sensitivity" and "specificity" are two frequently heard buzzwords in the field of medical diagnostics. Sensitivity refers to the assay's ability to detect even a small amount of biological agent in a sample. Specificity is the ability to detect a particular agent. Both are critical, according to Dorman—if an assay is not sensitive enough, you get false negatives; if it's not specific enough, you get false positives.

"Operation Desert Storm taught us that we need to have sensitive and specific technologies in a deployable laboratory,

to Identify Warfare Agents in Field Labs

capable of analyzing both biomedical and environmental samples," says Maj. John Scherer, Chief of DSD. Biomedical samples consist of tissue or bodily fluid samples from humans or animals, while environmental samples include air, soil, foliage, and water samples. All are important in a field setting, where the medical laboratory has three major roles - to support medical treatment facilities, to support preventive medicine surveillance, and to analyze samples from field detection systems.

One component of the FIBWA training is "real time" PCR using an instrument called the R.A.P.I.D. (Ruggedized Advanced Pathogen Identification Device) that was specially designed for military field labs. This instrument integrates Idaho Technology's LightCycler© Instrument technology into a portable, impact resistant package about the size of a briefcase. Distinctive software allows simple "push button" use of the R.A.P.I.D. by field personnel with minimal training. The technology offers rapid, safe, and accurate field identification of potentially dangerous pathogens.

"A New Level of Respect"

Sgt. Sean Brown from Fort Leonard Wood, MO, is a microbiologist with clinical laboratory and blood bank experience.
"Pretty cool!" he says when asked to describe the FIBWA course. "I love the field work - it's a lot of fun."

Having a good grasp of molecular biology helped, said Brown, who had done PCR before but enjoyed being trained on the latest instruments. In January 2005 he will be assigned to the CENTCOM testing lab.

When asked about the most surprising aspect of the course, he says without hesitation, "Getting to work with the real agents!" Though he is quick to add that all bacteria and viruses are deactivated before students handle them, he says "it still gives you a new level of respect for what we're doing."

Dorman strolls through the labs, pausing to check on each student's progress. Despite being peppered with questions from course attendees, he patiently describes the scene for a visitor. His group keeps busy - six student courses are offered per year, along with three "manager" courses. The latter are designed for decision makers like laboratory officers and commanders, who would get the lab results and act upon them.

Upon completion of the PCR training, the students spend four days on an assay known as electrochemiluminescence, or ECL. ECL is a well-established process in which certain chemical compounds emit light when electrochemically stimulated. The instrument of choice for the FIBWA program is the BioVeris Detection System™ (BVDS). BV™ technology is based on the measurement of electrochemiluminescence from BioVeris proprietary labels that are used in an immunoassay.

"We plan on introducing the next generation ECL instrument, the BioVeris M-Series® M1M System, next year," says Dorman. The M-Series M1M analyzer is a single channel M-Series instrument that was designed to meet military specifications and has been ruggedized for field use.

ECL offers certain advantages over the widely used ELISA, or enzyme-linked immunosorbent assay. ELISA is a sensitive laboratory method used to detect the presence of antigens or antibodies of interest in a wide variety of biological samples. However, says Dorman, "a traditional ELISA could take 15 or 16 hours. The ECL assay takes an hour to an hour and a half to run - so you get both speed and sensitivity without sacrificing specificity." There's another bonus: ECL training takes only a few days, while ELISA training could take a week or more.

Putting It All Together

Upon completion of the PCR and ECL units, the students take both a written and a practical exam. The true test, however, comes during the final week of the course, when they perform a field training exercise. According to Dorman, this provides an opportunity to integrate the course material with real-world scenarios that challenge the students' understanding and skills.

(Con't pg. 26)

Photo by Bill Dorman, (USAMRIID)

Ms. Andrea Stossel of the NBFAC sets up an ECL run on the BVDS.

Photo by Bill Dorman, (USAMRIID)

Ms. Miriam Reynolds of the NBFAC loads a centrifuge during a DNA extraction procedure.

Photo by Steve Forendo (USAMRIID)

Spc. Kelly Miller runs a gel electrophoresis.

Participants are given five scenarios to respond to, and must set up and operate a lab under field conditions. Working together as a team, they develop and implement a test plan based on the sample type and information received with each scenario. They are then expected to analyze the sample, troubleshoot any problems that may arise, and provide a final identification, if any, to the instructor. Evaluations are based on how well the students respond and solve problems throughout the exercise.

PFC Kelly Miller from Fort Eustis, VA, works in a hospital clinical laboratory, and finds the FIBWA focus on environmental samples "totally different." Unlike a clinical lab, she says, "out here you don't realize you messed up until you get your results back. In the field we would have to do it over; in the classroom, we try to figure out where the error occurred." Miller has been in the Army for two years and plans to make it a career. Like Brown, she'll do a tour of duty at the CENTCOM lab and says she is looking forward to it. Right now, though, she's up to her ears in the final field exercise.

"You have to put together everything you learned in the past three weeks - in one week!" she exclaims.

While the FIBWA course is designed for organizations within the Department of Defense, special considerations can be made for other governmental agencies. Several civilian employees of the Department of Homeland Security's National Biodefense Analysis and Countermeasures Center recently completed the course. In addition, students from U.S. Army National Guard Civil Support Teams-Weapons of Mass Destruction (CST-WMD) in Georgia and West Virginia attended over the summer, and Maj. Scherer is in the process of designing a specialized course just for that audience.

"USAMRIID continues to demonstrate its commitment to the warfighter, whether it's through research, direct analytical support, or training courses like FIBWA," says Col. Erik Henchal, USAMRIID commander. "In addition, as a partner in the National Interagency Biodefense Campus at Fort Detrick, we contribute to the Nation's overall defense against bioterrorism."

One Mask, Many Missions, Many Environments

By Kevin E. Puckace, Test Engineer, JPM IP

An ominous, white cloud approaches from the distant horizon. Minds race, pulses accelerate, the warfighters are poised. Is it a smoke round or a chemical attack? Fortunately, it's a phosphorous grenade.

In a world torn with conflict, the Department of Defense (DoD) relentlessly pursues improvements to Chemical, Biological, Radiological, and Nuclear (CBRN) defense equipment. One such program, aimed to increase protection and enhance overall mission performance, is the Joint Service General Purpose Mask (JSGPM).

The JSGPM is a lightweight, protective mask system that incorporates state-of-the-art technology providing a minimum of 24 hours of continuous, above-the-neck, head-eye-respiratory protection from known and anticipated future vapor, liquid, aerosol, and particulate CBRN and Toxic Industrial Chemical (TIC) threats.

The JSGPM is an aggressive effort that combines the cooperation, expertise, and experience of warfighters, scientists, engineers, and technicians representing commercial industry and the U.S. Army (USA), Air Force (USAF), Navy (USN) and Marine Corps (USMC) throughout the world. When compared to the currently fielded M40 and MCU-2/P series of protective masks, the JSGPM provides a considerable reduction in breathing resistance, weight, overall profile, and footprint, as well as, a significant improvement in field-of-view, drinking capacity, comfort, and compatibility with current and future co-developmental equipment.

The JSGPM will provide commonality among the services by replacing the M40 series of protective masks for USA and USMC ground and Combat Vehicle (CV) operations, as well as, the MCU-2/P series of protective masks for USAF and USN shore-based and shipboard applications.

In order to fulfill all of the functional requirements for inter-service and service unique missions, the JSGPM is available in two configurations: the XM50 for ground, shore-based and shipboard applications and the XM51 for CV operations. The XM51 includes all the components of the XM50, as well as, a removable hose assembly for rapid connection between the mask and CV collective protection systems; a durable, flame resistant hood for protection against liquid threats; and a CV microphone system for easy connection between the mask and CV helmets facilitating on-vehicle communications.

Additional items are also available for the XM50/ 51 systems to provide for laser eye protection, voice amplification, communications interface with air traffic control systems, vision correction and additional TIC filtration.

So how exactly does the DoD ensure that the U.S. military receives the finest possible

U.S. Navy Photo by PHAN Kyle T. Voigt

Operation Specialist 2nd Class Darien O'Neal prepares to check his Gas Mask (MCU-2/P) for a proper seal. USS Saipan (LHA 2) is responding to deployment orders received to support the war on terrorism.

mask system for their warfighters? One prominent method is a comprehensive test and evaluation process, which includes both laboratory and field assessments that employ the most advanced and reliable military and commercial test equipment and that solicit and incorporate warfighter feedback and recommendations.

Since 2001, nearly 3,000 mask systems have been subjected to a series of laboratory performance, protection, safety and operational environment tests. A few of these tests include fit and protection factor, particulate penetration, system and filter exposure to chemical agents, TICs, battlefield contaminants and adverse environments; prolonged storage in temperatures ranging from –46 to 71ºC; reliability, maintainability, decontamination, durability, optics, transportability, submergence, breathing and fire resistance, wearability, infrared detectability, communication, drinking capacity, and electromagnetic interference.

Additionally, the Joint Test Team conducts tests to assess integration and interface between current and future warfighter systems and equipment. Warfighters have performed a variety of mission and scenario specific operations utilizing mission essential items such as vehicles, weapons, clothing ensembles, optical devices, load bearing equipment, headgear, and communication and weapon systems. Furthermore, a close relationship and open exchange of information is maintained between the JSGPM program and other fielded and co-developmental programs, such as the Joint Protective Aircrew Ensemble, the Joint Service Aircrew Mask, the Joint Service Lightweight Suit Integrated Technology, the Joint Service Mask Leakage Tester, and the Military Eye Protection System, in order to ensure the highest level of equipment compatibility.

Since 2001, more than 2,000 warfighters, representing each Service, have participated in a variety of test excursions under some of the most extreme tropical, desert, arctic, shipboard, and temperate environmental conditions. Warfighter volunteers have performed a rigorous regimen of field exercises testing durability, operational effectiveness, performance, and human factors issues. A few participating military sites include: Aberdeen Proving Grounds, Schofield Barracks, USMC Air Station (Cherry Point and New River), Camp Lejeune, Key West Naval Air Station, U.S. Naval Surface Warfare Center (Indian Head and Panama City), Pearl Harbor Naval Station; aboard the USS Bonhomme Richard, Oak Hill, and Poncé; Forts Benning, Bragg, Campbell, Greeley, Knox, McClellan, Riley, and Rucker; and Eglin, Elmendorf, Hickam, Kelly, Lackland, Macguire, Moody, Seymour Johnson, Tinker, and Tyndall Air Force Bases.

Extensive testing has been accomplished to guarantee that the JSGPM will operate in all intended environments, while enabling the warfighter to operate their mission essential equipment safely, effectively and comfortably. Test and evaluation of the JSGPM is an on-going process that continually strives to balance performance, cost and schedule in an effort to provide an affordable, optimal product to the U.S. Armed Services. Although there are still several critical events in the program's future, fielding of the JSGPM is anticipated in 2006.

DoD Acquisition Process Strengthens Key Homeland Defense Program

By Lt. Col. Charles Cecchini, Product Manager
Weapons of Mass Destruction Civil Support

The terrorist attack on September 11, 2001, reinforced the need for efforts to secure our homeland. One of the DoD agencies that supports homeland defense is the Army Product Manager for Weapons of Mass Destruction Civil Support Systems (PM WMD CSS), an acquisition agency based at Aberdeen Proving Ground, MD. This office is part of the Joint Project Manager Guardian, which reports to the Joint Program Executive Office for Chemical and Biological Defense. The PM WMD CSS was chartered in April 2001, and has the responsibility of providing equipment the National Guard's Weapons of Mass Destruction Civil Support Teams (WMD CSTs). This equipment is used to characterize a CBRN event, provide situational understanding, and disseminate vital information on homeland terrorist attacks within the first hours.

The equipment at the core of this homeland defense capability is the Analytical Laboratory System (ALS) and the Unified Command Suite (UCS). These are mobile response systems, developed for the National Guard, to detect nuclear radiation and chemical or biological agents, and communicate the findings to the incident commander and DoD agencies. With this equipment, the National Guard teams can advise local authorities on managing the effects of an attack, minimizing the impact on the civilian populace, and assist in the deployment of follow-on protection and recovery assets.

Responding to DoD's mission to support domestic contingencies, PM WMD CSS applied sound acquisition strategies to develop, test and field the new generation of the mobile analytical laboratory system online. Initial steps included setting the goals of the initiative and developing an acquisition strategy for equipping, producing, and fielding an enhanced system – the ALS Block 0.

Today these systems have been thoroughly tested, evaluated, and distributed to 32 WMD Civil Support Teams throughout the country. Application of the defense acquisition process to achieve the required operability and availability of the systems made this accomplishment possible. Utilizing an inclusive management approach, PM WMD CSS included the National Guard WMD CSTs and the testing proponent, the Army Test and Evaluation Command (ATEC), in their program planning. Lead-

Photo by Steve Lusher

ers and members of the CSTs were asked to provide input to the types and layout of components to be installed in the ALS, giving them a voice in the development of requirements documentation. ATEC, as the independent tester, reviewed both the technical and the operational parameters for the equipment, which also involved them in the development stage and development of the Operational Requirements Document (ORD), which was approved August 2001. Participation of the stakeholders up front in the process of developing the ALS ensured that the capabilities the CSTs needed to accomplish their mission were incorporated into the new system, and that ATEC received a system ready for testing that met operational standards.

One of the goals for the program was articulated to meet a particular challenge: strengthening the relationships among the program stakeholders.

PM WMD CSS worked with the National Guard and the US Army Chemical School Directorate of Combat Developments in the development and approval of the ALS ORD. The ORD focused on the ALS as a System Enhancement Program (SEP) and divided the project into three definitive, manageable phases: Block 0, Block I, and Block II. ALS Block 0 consisted of developing, integrating and modifying a Commercial-Off-the-Shelf (COTS) chassis and shelter. ALS Block I upgrades the existing Chemical and Biological analytical components to the analytical suite bring enhanced system capability to meet most of the ALS ORD requirements. ALS Block II will provide the next generation capability, incorporating advanced automated and integrated detection, identification and analysis technologies.

This strategy allowed us to rapidly and effectively develop and field an effective ALS Block 0 system to meet most critical near term operational requirements that is being used today. The use of existing COTS technologies significantly reduced development time, reduced program risk, and supported a more rapid fielding. The success of this type of program planning can be measured in the time it took to accomplish the ALS Block 0. The initial 36 ALS were prototyped, engineered, tested, produced and fielded in less than two years.

The testing conducted during Block 0 characterized and documented the performance of the ALS. Testing during the first phase of the ALS program encompassed the entire Block 0 system. It included platform operation, equipment functionality, safety and health hazards, system transportation, and reach-back communications compatibility with the UCS. Our comprehensive testing rigor was instrumental to the program's goal to deliver reliable, affordable and sustainable equipment.

This unique civil-military capability went to the Milestone Decision Authority (MDA) for a MC decision April 30, 2003, with a broad base of support, from the user, tester, developer, logistician and funding authority. In his Milestone C review for full-rate production of the ALS, Brig. Gen. Stephen V. Reeves, Joint Program Executive Officer for Chemical and Biological Defense, directed product verification testing of the initial operational test issues. Once these were mitigated, he approved deployment of the ALS Block 0 vehicle to the National Guard WMD CSTs within a year of Milestone C.

Fielding of the 36 ALS Block 0 vehicles – one for each of the 32 National Guard Bureau WMD CSTs, two training vehicles, and two backup vehicles – began in April 2004 and was completed in July 2004, five months ahead of schedule. This new capability for defending the nation was accomplished through the application of sound DoD acquisition processes and resulted in a cohesive and effective program. The National Guard is well positioned to maintain configuration control, supportability and sustainment of the equipment for its full life cycle. The PM is in the process of fielding an additional 23 CST's worth of equipment, expanding the National Guard's capability to fulfill their Homeland Defense mission to all 50 States and four Territories.

Analytical Laboratory System (ALS)

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10. Are there any additional comments you would like to share about Chem-Bio Defense Quarterly?

‘The Reason for Our Success is Our People.’

JPEO-CBD staffers represent a small cadre of those who contributed to the Walter Reed U.S. Army Wounded Soldiers Support Drive Campaign. Picture from left to right are Tonya Maust, Glenn Main, Jamie Gillette, Archie Attarian, Steve Siegel, Larry Wakefield, Janet Gordon, Julius Evans, Lauren Ishmael, Joe Donohoe and Peter Hernandez.

CBMS poses for a group photograph in front of gifts presented for the Toys for Tots program. Christie Carbaugh, Brenda Hernandez, SGT Alderdice, SSGT Davis, Jennifer Starks and Shelley Hilgenberg.

AWARDS

Pamela Poole	Special Act Award
Anita Walker	Special Act Award
Christopher Rok	Special Act Award
William Powell	Certificate of Commendation
Efrain Quinones	Certificate of Commendation
Lt. Col. Mark Malatesta	Defense Meritorious Service Medal

Mrs. Juliet Bernritter, Col. Stephen Berte, Joint Project Manager, Chemical Biological Medical Systems (center), and Lt. Col. Travis Bernritter, Joint Product Manager, Joint Vaccine Acquisition Program, run the Army 10 Miler.

Command Sgt. Maj. Patrick Z. Alston, (10th) Regimental Command Sgt. Maj. of the U.S. Army Chemical Corps speaks with Douglas Bryce, Joint Project Manager, Individiaul Protection, who is shaking hands with the Chief of Chemical and Commandant, U.S. Army Chemical School, Brig. Gen. Stanley H. Lillie. Bryce, receiving the Order of the Dragon Award, was recently selected as the Deputy Joint Program Executive Officer for Chemical and Biological Defense.